PATENT SPECIFICATION 806,388

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International Classification :—A01g, B05.

COMPLETE SPECIFICATION.

Improvements in or relating to Horticultural Irrigation Apparatus.

We, CHASE PROTECTED CULTIVATION LIMITED, a British Company, of Cloche House, Shepperton, Middlesex, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to horticultural irrigation apparatus of the type in which a flexible tube connected to a liquid supply is provided at intervals along its length with fine orifices, whereby continuous irrigation may be effected by leaving the tube in contact with the ground.

A fine and substantially uniform flow or trickle of liquid may be obtained at each orifice by providing the tube with perforated studs or nipples inserted in holes spaced along the tube, these metering the flow at each point when the tube is supplied with liquid under pressure. This pressure may be quite low, and indeed must be low to produce the low rate of flow through individual orifices of a fineness that can reasonably be provided in the studs or nipples.

However, if hard water provides the only available supply, the orifices become clogged in time, so that neither the desired rate of flow nor the necessary uniformity of flow can be maintained. If the water is not free from algae, the tendency to clogging becomes still more troublesome.

The object of the invention is to provide an irrigation tube of this type that is not susceptible to clogging from such causes as these.

According to the present invention, a flexible tube for use in continuous horticultural irrigation has holes spaced at intervals along its length, and each hole is covered by a sleeve frictionally fitting closely round the periphery of the tube. The sleeve may consist of a short length of flexible tube, or it may be a close-wound coil of spring wire, the internal diameter of the short length of tube or the coil, as the case may be, being substantially equal to the outside diameter of the main tube. With liquid supplied under suitable pressure, there is a flow through each of the holes from which escape takes place by the liquid being forced between the periphery of the main tube and the inner wall of each short tube or, in the case of close-wound coils, between the turns of each coil.

The holes in the main tube do not have to be fine, because they themselves do not provide a metering action. In the case of a short length of tube being used for each sleeve, the metering action results from the close fit of each sleeve round the main tube and the resilient fit of one round the other. This yielding fit permits the applied pressure to force a reasonably steady amount of liquid from the mouth of the hole through the fine gap made available round the main tube, regardless of any clogging influences in the liquid. When a coil of spring wire is used for each sleeve, the metering action results from the resistance of the coil to having its turns forced apart by the escaping liquid. Again, a steady amount of liquid is forced through the coil regardless of any clogging influences in the liquid.

The invention will now be described with reference to the accompanying drawings in which:—

Figure 1 is a general view of a length of irrigation tube incorporating one embodiment of the invention.

Figure 2 is an enlarged secton on the line 2—2 of Figure 1.

Figure 3 is a section on the line 3—3 of Figure 2.

Figures 4 to 6 correspond to Figures 1 to 3, but show another embodiment of the invention.

In Figures 1 to 3, a length of flexible irrigating tube 1 has holes 2 at spaced intervals, each hole being countersunk to form a mouth 3 that is covered by a sleeve 4 consisting of a short length of flexible tube frictionally fitting closely round the periphery 5 of the tube 1. Liquid is supplied under pressure to the inside 6 of the tube 1 and flows through the holes 2 from which escape takes place by the liquid being forced between the periphery 5 of the tube 1 and the inner surface 7 of each sleeve 4. Even though foregin matter in the liquid may tend to clog the fine gap made available between the tube 1 and the sleeve 4, the latter will still yield under the applied pressure so that a continuous flow will be maintained.

In Figures 4 to 6, a similar length of flexible irrigating tube 1A has holes 2A at spaced intervals, each hole being countersunk to form a mouth 3A that is covered by a sleeve 8 consisting of a close-wound coil of spring wire, such as phosphor-bronze, frictionally fitting closely round the periphery 5A of the tube 1A. Again, liquid supplied under pressure to the inside 6A flows through the holes 2A, but, although some liquid may percolate along the helical space bounded by adjacent turns 9 of the coil and the periphery 5A of the tube 1A, the main way of escape for the liquid is between the adjacent turns 9 themselves. Thus the coil 8 is extended and will be extended regardless of any clogging mater in the liquid which may have been deposited between the coil and the tube 1A.

The holes may be $^1/_{16}$" diameter. With a tube of $\frac{1}{4}$" outside diameter, the sleeves, if formed of flexible tube, may have a length of $\frac{3}{8}$" to $\frac{1}{2}$" and an outside diameter of $^{11}/_{16}$". They hold themselves in position by friction, and are not readily disturbed as the main tube is drawn from the ground to and from the position to be irrigated. The coil sleeves may be of small gauge wire, and may be relatively short, say, 6 or 7 turns at 25 turns to the inch, and the inside diameter of the coil may be slightly smaller than the outside diameter of the tube to assist in maintaining the sleeve in position. The precise position of the sleeves is not critical, but the holes in the tubes should emerge substantially mid-way along the length of the sleeves.

WHAT WE CLAIM IS:—

1. A flexible tube for use in continuous horticultural irrigation having holes spaced at intervals along its length, each hole being covered by a sleeve frictionally fitting closely round the periphery of the tube.
2. A flexible tube as in Claim 1, wherein the sleeve consists of a short length of flexible tube the internal diameter of which is substantially equal to the outside diameter of the main tube.
3. A flexble tube as in Claim 1, wherein the sleeve consists of a close-wound coil of spring wire, the internal diameter of the coil being substantially equal to the outside diameter of the tube.
4. A flexible tube as in any of Claims 1 to 3, wherein the holes are countersunk to provide a mouth.
5. Flexible tubes for use in continuous horticultural irrigation substantially as hereinbefore described with reference to the accompanying drawings.

HULSE & CO.,
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PROVISIONAL SPECIFICATION.

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This invention relates to horticultural irrigation apparatus of the type in which a tube connected to a liquid supply is provided at intervals along its length with fine orifices, whereby continuous irrigation may be effected by leaving the tube in contact with the ground.

A fine and substantially uniform flow or trickle of liquid may be obtained at each orifice by providing the tube with perforated studs or nipples inserted in holes spaced along the tube, these metering the flow at each point when the tube is supplied with liquid under pressure. This pressure may be quite low, and indeed must be low to produce the low rate of flow through individual orifices of a fineness that can reasonably be provided in the studs or nipples.

However, if hard water provides the only available supply, the orifices become clogged in time, so that neither the desired rate of flow nor the necessary uniformity of flow can be maintained. If the water is not free from algae, the tendency to clogging becomes still more troublesome.

The object of the invention is to provide an irrigation tube of this type that is not susceptible to clogging from such causes as these.

According to the present invention, a flexible tube for use in continuous horticultural irrigation has holes spaced at intervals along its length, and each hole is covered by a sleeve consisting of a short length of flexible tube of larger bore fitting closely round the periphery of the main tube. With liquid supplied under suitable pressure, there is a flow through each of the holes from which escape takes place by the liquid being forced between the periphery of the main tube and the inner wall of each sleeve.

The holes in the main tube do not have to be fine, because they themselves do not provide a metering action: this function results from the close fit of each sleeve round the main tube and the resilient fit of one round the other. This yielding fit permits the applied pressure to force a reasonably steady amount of liquid from the mouth of the hole through the fine gap made available round the main tube, regardless of any clogging influences in the liquid. Thus, the holes may be $^1/_{10}$" diameter. Advantageously they are countersunk, to provide a mouth of say $\frac{1}{8}$" diameter.

The sleeves, which have a main tube of $\frac{1}{2}$" outside diameter may have a length of $\frac{3}{8}$" or $\frac{3}{4}$" could itself be $^{11}/_{16}$" outside diameter, hold themselves in position by friction, and are not readily disturbed as the main tube is drawn from the ground to and from the position to be irrigated. The precise position of the sleeve is not critical, but the hole in the main tube should emerge substantially mid-way along the length of the covering tube.

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806,388 COMPLETE SPECIFICATION
1 SHEET

FIG.1.

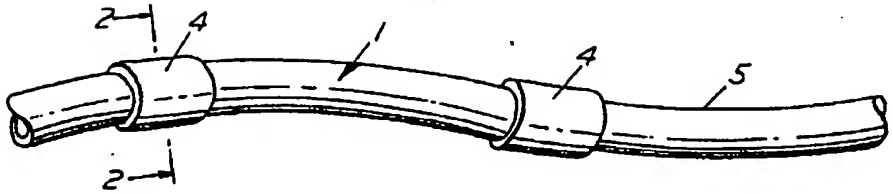


FIG.2.

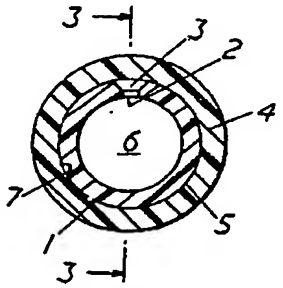


FIG.3.

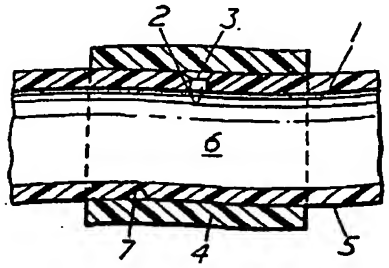


FIG.4.

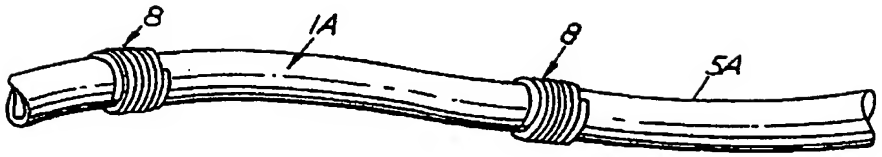


FIG.5.

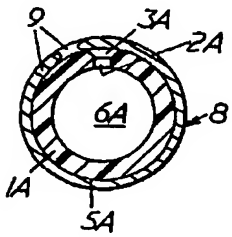


FIG.6.

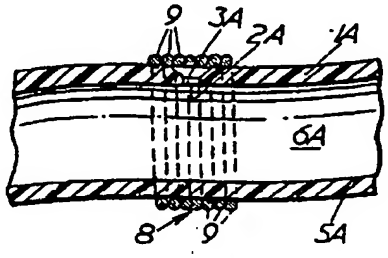


Fig.1

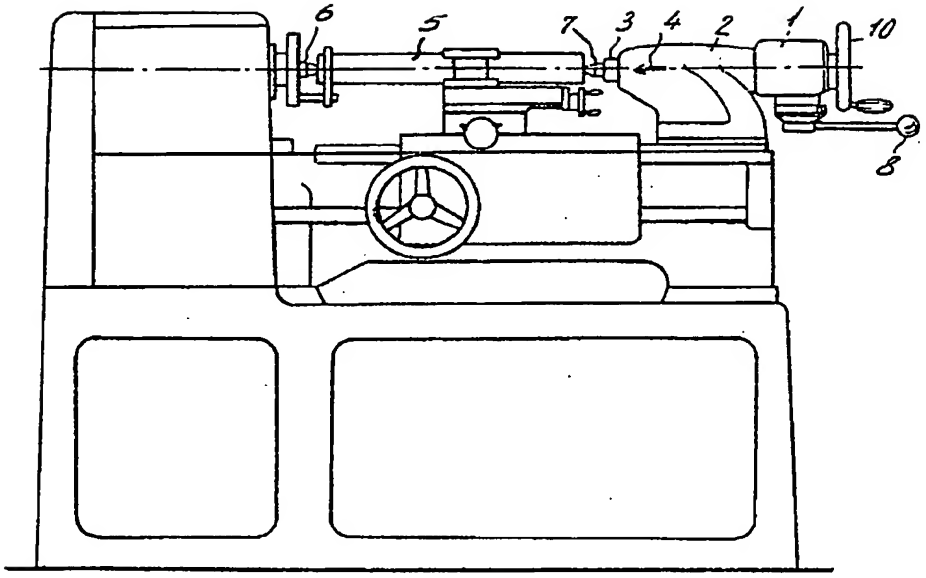
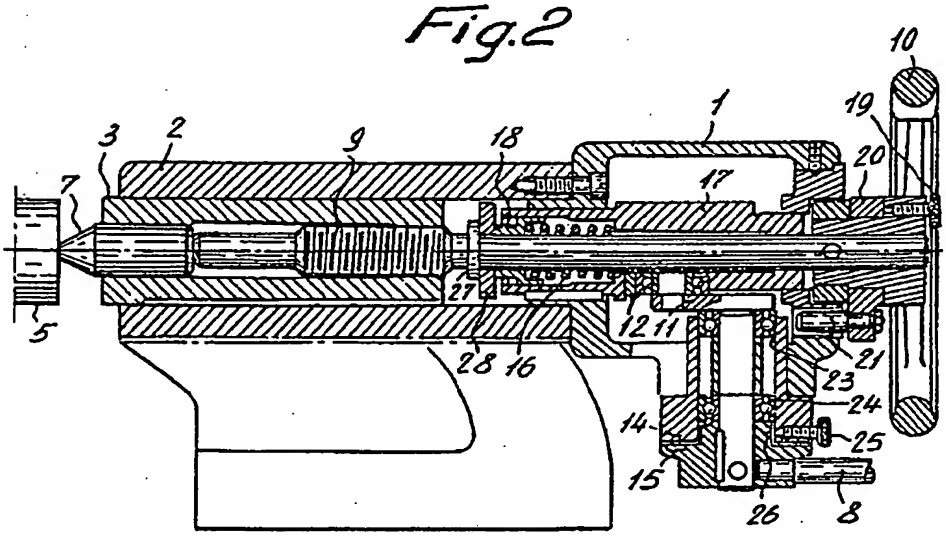


Fig.2



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SHEETS 1 & 2

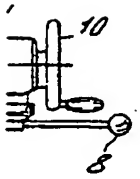


Fig.4

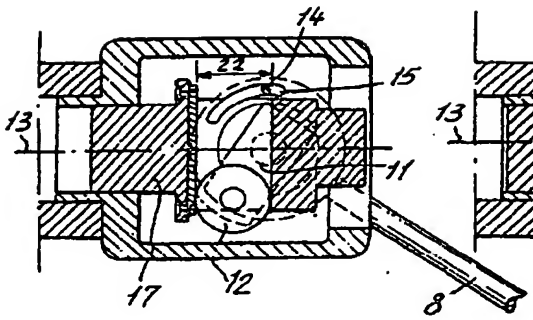


Fig.3

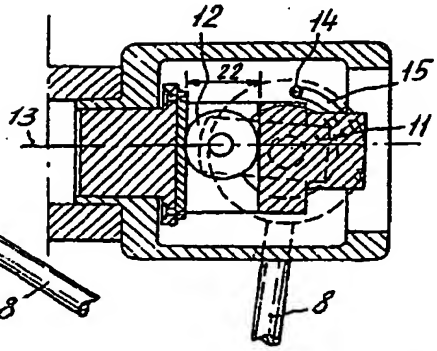
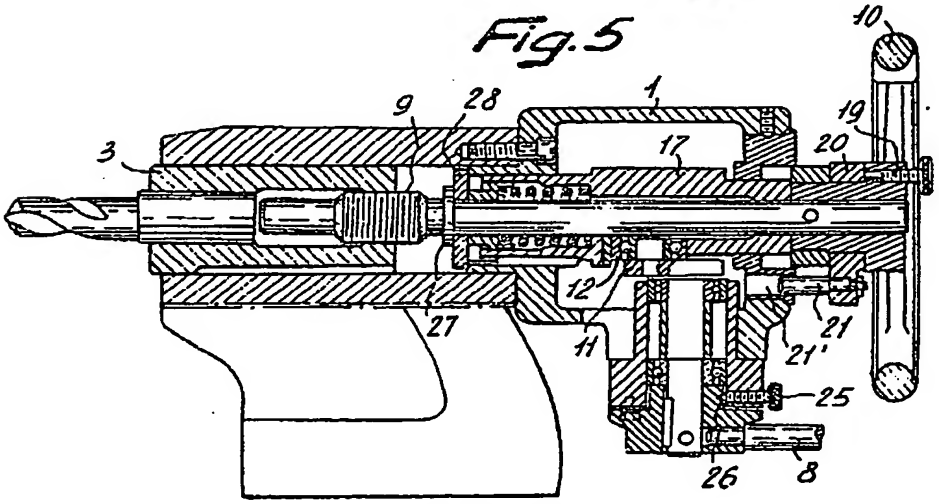


Fig.5



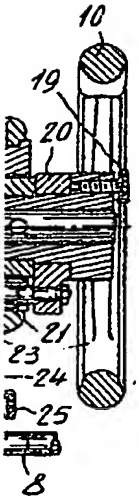


Fig.6

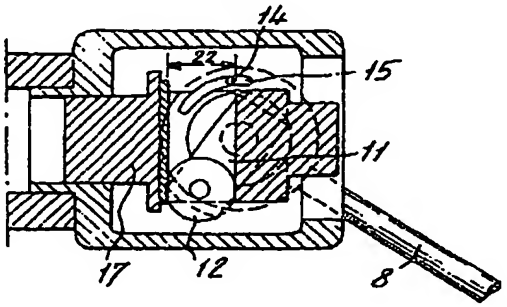


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Fig.1

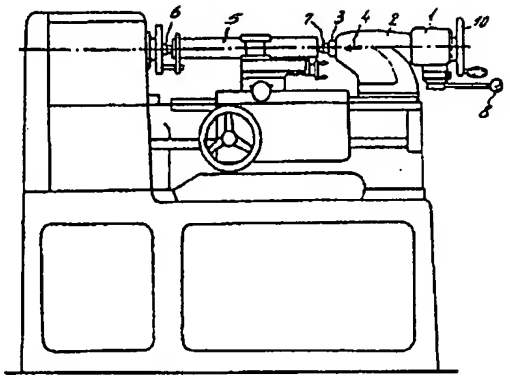

Fig.2

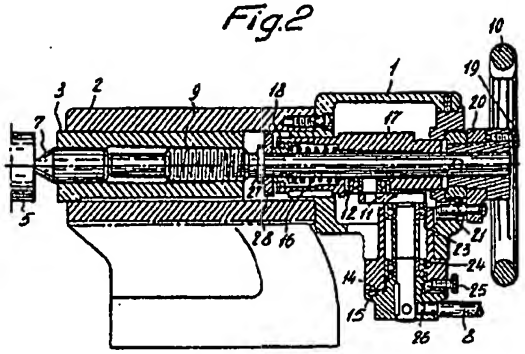

Fig.4

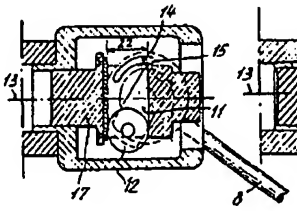

Fig.3

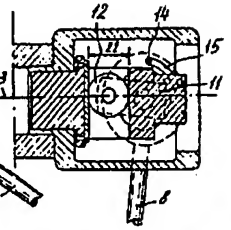

Fig.5

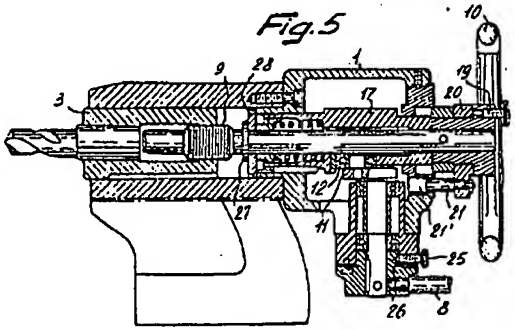

Fig.6